

12.0 Mexican Hat, Utah, Disposal Site

12.1 Compliance Summary

The Mexican Hat, Utah, Disposal Site, inspected on April 24, 2007, was in good condition. Runoff from storm events continues to transport sediment into the west diversion channel resulting in low-density vegetation growth within the entire length of the channel; however, the performance of the diversion channel has not been impaired. Tamarisk plants found on site were cut and treated with herbicide. Trash and tumbleweeds continue to accumulate on the site and along sections of the perimeter fence. A seismic monitoring station was installed inside the perimeter fence at the site as part of the EarthScope USArray Project; data will be collected for two to three years.

In accordance with accepted recommendations presented in the seep monitoring evaluation report, annual monitoring of seep flows was conducted during the inspection for a second year; overall, the seep flows were reduced as compared to 2006. The remaining four monitor wells at the site were decommissioned. The LTSP was revised to reflect Navajo Nation concurrence to discontinue water quality monitoring of the seeps in lieu of continued annual observations of seep flows, and to present the results of the best management practice (BMP) groundwater monitoring conducted.

No cause for a follow-up or contingency inspection was identified.

12.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Mexican Hat, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site are specified in the *Long-Term Surveillance Plan [LTSP] for the Mexican Hat Disposal Site, Mexican Hat, Utah* (DOE/AL/62350–207, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, June 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 12–1.

Table 12–1. License Requirements for the Mexican Hat, Utah, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.1	Section 12.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 12.3.2
Routine Maintenance and Repairs	Section 5.0	Section 12.3.3
Groundwater Monitoring	Section 4.3	Section 12.3.4
Corrective Action	Section 6.0	Section 12.3.5

Institutional Controls—The United States of America holds the 119-acre disposal site in trust for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. DOE and the Navajo Nation executed a Custodial Access Agreement (CAA) that conveys to the federal government title to the residual radioactive materials stabilized at the repository site and ensures that DOE has perpetual access to the site. UMTRCA authorized DOE to enter into Cooperative Agreement (CA) DE-FC04-85AL26731 with the Navajo Nation and the U.S. Nuclear Regulatory

Commission (NRC) required it prior to bringing the site under the general license. The purpose of the CA was to perform remedial actions at the former processing sites. The site was accepted under the NRC general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal control of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Inspectors found no evidence that these institutional controls were ineffective or violated.

12.3 Compliance Review

12.3.1 Annual Inspection and Report

The site, located south of Mexican Hat, Utah, was inspected on April 24, 2007. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 12–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

12.3.1.1 Specific Site Surveillance Features

Access, Fence, Gate, and Signs—The site is accessed via a short, unmarked dirt road off U.S. Highway 163, just south of the San Juan River, which heads east and ends at a graded parking area. An eroded channel is developing on the access road between the parking area and the entrance gate; vehicular access may become difficult in the future. No repairs are necessary at this time.

A barbed-wire perimeter fence set inside the property boundary, with a chain-link gate at the site entrance, encloses the site. The center rod to the entrance gate is damaged, causing the west half to be inoperable; however, vehicles can still access the site through the east half of the gate and, therefore, no repairs are planned at this time (PL–1).

An entrance sign is located at the gate and was in excellent condition (PL–1). There are 43 perimeter sign locations along the property boundary and each location has a pair of signs: an upper property ownership sign and a lower radioactive materials disposal site warning sign. Some perimeter signs have bullet holes or were dented but were legible. Perimeter sign P37 is missing the lower radioactive materials disposal site warning sign. The remaining signs were in excellent condition.

Site Markers and Monuments—The two site markers, four survey monuments, and 12 boundary monuments were inspected. All site markers were in good condition. Boundary monument BM–11, located on a slope subject to erosion, remains stable. The markings on survey monument SM–5 are illegible; however, no action is required at this time. All other boundary and survey monuments were in good condition.

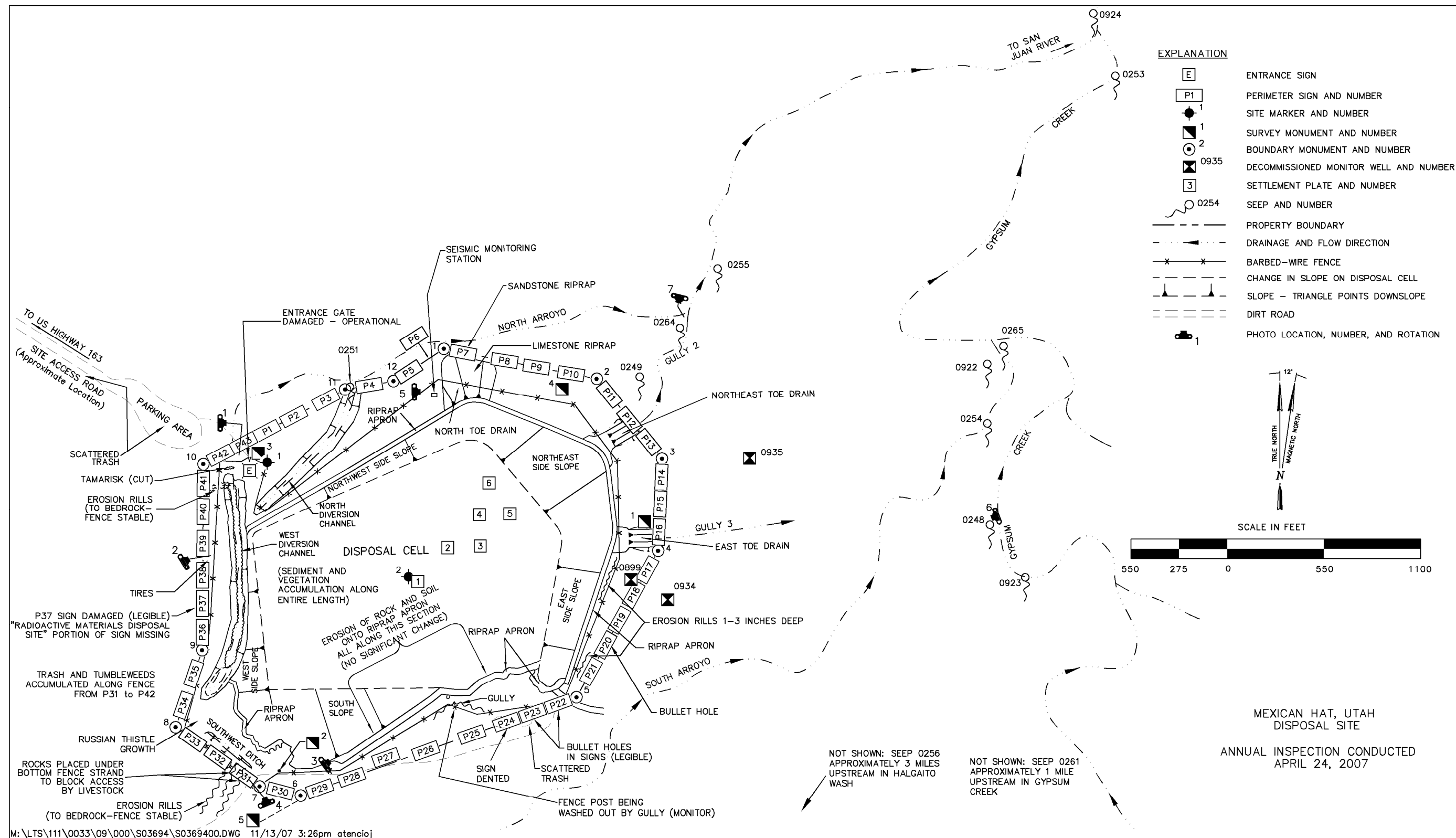


Figure 12-1. 2007 Annual Compliance Drawing for the Mexican Hat, Utah, Disposal Site

- 12A Monitor Wells**—The three monitor wells (MW-0899, MW-0934, and MW-0935) located on site and the one upgradient background monitor well located off-site (MW-0909) were decommissioned in April 2007 following concurrence by the Navajo Nation. Groundwater monitoring is not required by the LTSP under the current protection strategy and was only performed as a BMP due to concerns raised by the Navajo Nation.

12.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the riprap-covered disposal cell top slope; (2) the riprap-covered side slopes and diversion ditches; (3) the area between the disposal cell and the site boundary; and (4) the outlying area. The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Top of Disposal Cell—The top of the riprap-armored disposal cell was in excellent condition (PL-2). There was no evidence of differential settling, cracking, burrowing, or other modifying processes that could affect the integrity of the cell. All visible components of the disposal cell and cover were functioning as designed. No vegetation was observed to be growing on top of the disposal cell.

Side Slopes, Toe Drains, Aprons, and Diversion Channels—Inspectors saw no evidence of differential settling, slumping, or other evidence of instability on the side slopes of the disposal cell.

A section along the south apron has been monitored since construction because rock and soil have sloughed off the adjacent steep hill slope onto the apron. Based on comparisons with photographs from previous inspections, there was no significant increase in accumulation of the red sandstone and soil along the south apron (PL-3). As observed in past years, there was no evidence of channel erosion in this area, and the sloughed material has not filled the void spaces in the apron riprap beyond the toe of the hill slope. It is anticipated that a minor amount of unstable rock from the hill slope will, over time, continue to fall onto the apron; however, the amount of material that will eventually accumulate on the edge of the apron in this area will have no detrimental impact on the performance of the apron or the disposal cell. Nevertheless, inspectors will continue to observe material that has fallen and accumulated on the edge of the apron in this area as a BMP.

Areas off-site and upslope continue to erode and transport sediment into the west diversion channel and the southwest ditch. Plant growth, primarily annual weeds, is establishing where the sediment has accumulated in the west diversion channel (PL-4). The sediment accumulation and plant growth have not affected the performance of these storm water diversion structures, and the rate of sedimentation is expected to diminish as the upgradient landscape stabilizes.

- 12B** Tamarisk, an undesirable invasive shrub, was again found growing within the outlet of the west diversion channel, and was cut and treated with herbicide.

Area Between the Disposal Cell and the Site Boundary—Minor erosional rills and gullies are present upstream of the west diversion channel and southwest ditch, and along the east side slope of the cell. Though some sediment is entering the diversion structures, these erosion features are not a problem and are expected to stabilize. Hill slopes around the disposal cell remain stable with only minor accumulations of loose material at the toe of the slopes.

- 12C Scattered trash continues to accumulate in and adjacent to the site. Although most of the trash remains offsite, incremental trash removal on site will be performed as part of the annual inspections, as needed. Vehicle tracks continue to be observed in the areas between the perimeter fence and the site boundary, indicating occasional trespass onto the disposal site property. Trash accumulations and trespassing will continue to be monitored; currently, they are not affecting the integrity of the site.
- 12D A seismic monitoring station was installed inside the perimeter fence on the north side of the disposal site (PL-5). This seismic monitoring is being conducted under the EarthScope USArray Project; a project funded by the National Academy of Sciences for the purpose of collecting seismic data every 200 square miles across the entire continental United States and Alaska. The seismic monitoring station will collect data at the site for a period of two to three years, at which time the station will be removed. The disposal site was desirable, in part, because it is located in a controlled area. This monitoring supports DOE's effort to provide site reuse, as desired, under the Legacy Management Program.

Outlying Area—The area surrounding the site was visually inspected for signs of erosion, development, or other disturbance that might affect site integrity or security. Sediment erosion and deposition, trash accumulation, and evidence of off-road vehicle activity continue adjacent to the site. However, the site remains secure and these off-site conditions are not affecting the integrity or the performance of the site.

12.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2007.

12.3.3 Routine Maintenance and Repairs

No routine maintenance or repairs were made at the site in 2007.

12.3.4 Groundwater Monitoring

Groundwater in the uppermost aquifer is not affected by the disposal cell or by legacy uranium processing-site activities because of an effective aquitard and an upward hydraulic gradient that occurs beneath the site. Both of these hydrogeologic conditions prevent any downward migration of overlying water into the uppermost aquifer; therefore, monitoring of groundwater within this aquifer is not required by the LTSP.

However, due to concerns raised by the Navajo Nation, groundwater monitoring was performed at the site from November 2000 to August 2002, as a BMP. This monitoring was performed to demonstrate that no site-related contamination occurred in the uppermost aquifer and that the upward hydraulic gradient continued. The groundwater monitoring results from this two-year period confirmed these conditions existed and are presented in the report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* (March 2006). This report was submitted to the Navajo Nation in March 2006. In July 2006, the Navajo Nation's concurrence was received that continued groundwater monitoring of the uppermost aquifer at the site was not necessary. As a result, DOE decommissioned the remaining four monitor wells at the site in April 2007.

12.3.5 Seep Monitoring

From 1998 through 2005, in accordance with the LTSP, and when sufficient flows have allowed, seep water quality monitoring was performed as a BMP due to concerns raised by the Navajo Nation over cell performance and historical processing site-related contamination. In 2006, an evaluation of the seep-monitoring program was conducted and presented in the report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* (March 2006). Based on the monitoring results, the hydrogeological conditions at the site, the continued low yield (flows) from the seeps, and the absence of any receptors to demonstrate risk, a recommendation was made to discontinue water quality monitoring of the seeps in lieu of observations of seep flow rates during the annual site inspections. Annual observation of seep flows will continue with the understanding that if they significantly increase, as compared to historical levels, water quality monitoring would resume. In August 2006, the Navajo Nation conditionally concurred with these recommendations. The report was submitted to the NRC in August 2006.

- 12E The site LTSP was revised and submitted to NRC in October 2007 to reflect the Navajo Nation concurrence to discontinue water quality monitoring of the seeps in lieu of continued annual observations of seep flows, and to present the results of the best management practice (BMP) groundwater monitoring performed, as discussed in the previous section. The revised LTSP states that annual observation of seep flows will continue for a minimum period of ten years at which time an evaluation will be performed to determine the need to continue or discontinue the monitoring of seep flows. As mentioned above, the revised LTSP also states that if the seep flows are observed to have significantly increased, as compared to historical levels, the need to resume water quality monitoring would be re-evaluated.

In accordance with the revised LTSP, visual monitoring of seep flows was conducted during the 2007 annual inspection. The flows of six seeps were observed and documented to be negligible or non-existent. The seeps are primarily the result of perched water that leaked from the former processing site tailings pond for many years and to a lesser degree the result of transient drainage from the wet tailings placed within the disposal cell. Seep flows are anticipated to diminish over time; however, a minor amount of recharge does occur as evident by the presence of seeps upgradient of the former processing site and the disposal cell. Historical documentation and records also indicate the presence of seeps prior to former processing site operations.

All seeps observed during the 2007 site inspection are listed in the LTSP, except seep 0264 (which replaced Seep 0249 in 1995 because of insufficient flow for sampling). Only a minor

amount of standing water was found in one of the seeps (0248); of the remaining four seeps, three were found dry and one was observed with moist soil. Table 1 provides observations and descriptions of seep flows (qualitative).

In 2007, the most significant flow was observed in seep 0248, located in Gypsum Creek and downgradient from the disposal cell (PL-6). The flow was similar to that found in 2006, with only a very small amount of standing water in a pool approximately 1 foot in diameter and 1 inch in depth. Seep flow was observed to be running down and dripping from the rock face above the small pool. No flow occurs past the small wetted area. Besides tamarisk, only a minimal amount of riparian vegetation is found at this location.

In 2006, seep 0264 was observed to have the most significant flow, although still minimal (note: 2006 observations were made at approximately the same time of the year). Seep 0264 is located directly downgradient of the disposal cell at the confluence of North Arroyo and Gully 2. In 2006, seep 0264 consisted of a wetted area that encompassed approximately 15 feet by 25 feet of riparian vegetation, with standing water (not more than 1 inch in depth) occurring in a couple of locations. In 2007, no standing water was observed at seep 0264 (only a small area of moist soil) and the riparian vegetation was found greatly reduced and stressed from the lack of water (PL-7).

Table 12-2. Observation and Description of Seeps at the Mexican Hat, Utah, Disposal Site

Seep Location Number	Drainage	Flow Orientation from Disposal Cell	Observations and Descriptions of Seep Flow (Qualitative)
0248	Gypsum Creek	Downgradient	Most significant seep flows in 2007, although minimal (running down and dripping from adjacent rock face). Very small pool of standing water (~1' diameter, ~1" depth); no flow from the pool of standing water or the immediate area. Soils moist in immediate area surrounding the seep. Minimal vegetation – primarily tamarisk (very little other riparian vegetation).
0249	Gully 2	Downgradient	Dry, no flow or standing water; no evidence of a seep (i.e.; no moist soils or riparian vegetation were present).
0251	North Arroyo	Downgradient	Dry, no moist soil present; only a small amount of evaporite present. Minimal vegetation – primarily tamarisk (very little other riparian vegetation).
0254	South Arroyo	Downgradient	Dry, no flow, standing water, or moist soil present. The minor amount of evaporite present is the only evidence of soil moisture or seep (very little riparian vegetation besides tamarisk).
0264	North Arroyo	Downgradient	Significantly reduced flow from 2006. Only small area of moist soil present; no standing water. Riparian vegetation greatly reduced and stressed.
0922	South Arroyo	Downgradient	Small area of moist soil and evaporite present beneath rock ledge where seep emerges. No significant flow; small amount of water running down rock face. No standing water. Minor amount of riparian vegetation present (primarily tamarisk).

Note – Warning signs, that stipulate to not drink the water, remain posted at the seeps.

12.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2007.

12.3.7 Photographs

Table 12–3. Photographs Taken at the Mexican Hat, Utah, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	90	View of the site entrance gate, entrance sign, and site marker SMK-1; the disposal cell in the background.
PL–2	60	The northwest corner and side slope of the disposal cell.
PL–3	55	The disposal cell apron along an area that tends to slough; no change from previous year.
PL–4	340	View of the west portion of the disposal cell, showing sediment and vegetation in the west diversion channel.
PL–5	90	USArray seismic monitoring station at the base of the disposal cell's north side slope and west of the north toe drain.
PL–6	250	Seep 0248.
PL–7	195	Seep 0264.



HAT 4/2007. PL-1. View of the site entrance gate, entrance sign, and site marker SMK-1; the disposal cell in the background.



HAT4/2007. PL-2. The northwest corner and side slope of the disposal cell.



HAT 4/2007. PL-3. The disposal cell apron along an area that tends to slough; no change from previous year.



HAT 4/2007. PL-4. View of the west portion of the disposal cell, showing sediment and vegetation in the west diversion channel.



HAT 4/2007. PL-5. USArray seismic monitoring station at the base of the disposal cell's north side slope and west of the north toe drain.



HAT 4/2007. PL-6. Seep 0248.



HAT 4/2007. PL-7. Seep 0264.

End of current section.